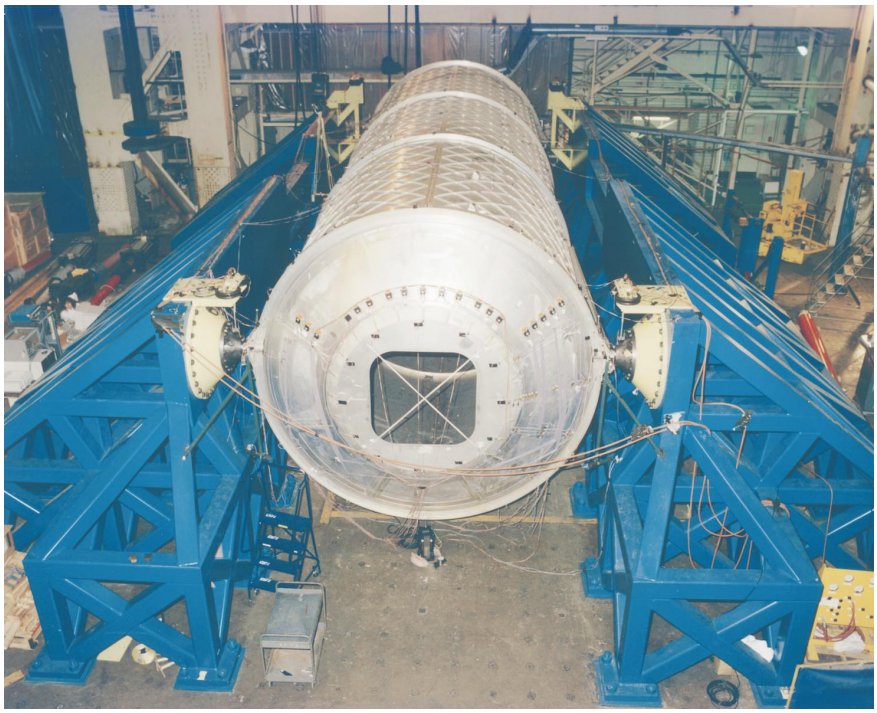
Technology Opportunity

Structural Test Capabilities at Marshall Space Flight Center (MSFC)

The world class Structural Test Facilities of MSFC's Structures and Dynamics Laboratory provide an environment where NASA engineers test aerospace structures and systems used by both Government agencies and the private sector. With a vast engineering technical base, interconnected facilities, equipment, and infrastructure, these dynamic load, structural strength, and experimental test activities are conducted to support the design, development, certification, and operation of flight structures, payloads, systems, and components.

Marshall's structural testing capabilities include nine separate discipline-oriented facilities housed in three main buildings. The largest suite of facilities, housed in MSFC's building 4619 (shown in the inside illustration), is a high-bay complex that includes laboratory space, test cells, and utility support necessary for structural and dynamic test activities. Two other facilities, in buildings 4572 and 4699, are also used for structural testing at Marshall.



Potential Commercial Uses

Although MSFC's Structural Test Facilities were designed to validate the structural integrity of space hardware, they have the capability to support private sector projects. For example, industry engineers could use the facilities at Marshall to test newly developed bridge structures, do vibroacoustic testing, and simulate conditions often experienced during earthquakes.

National Aeronautics and Space Administration

George C. Marshall Space Flight Center

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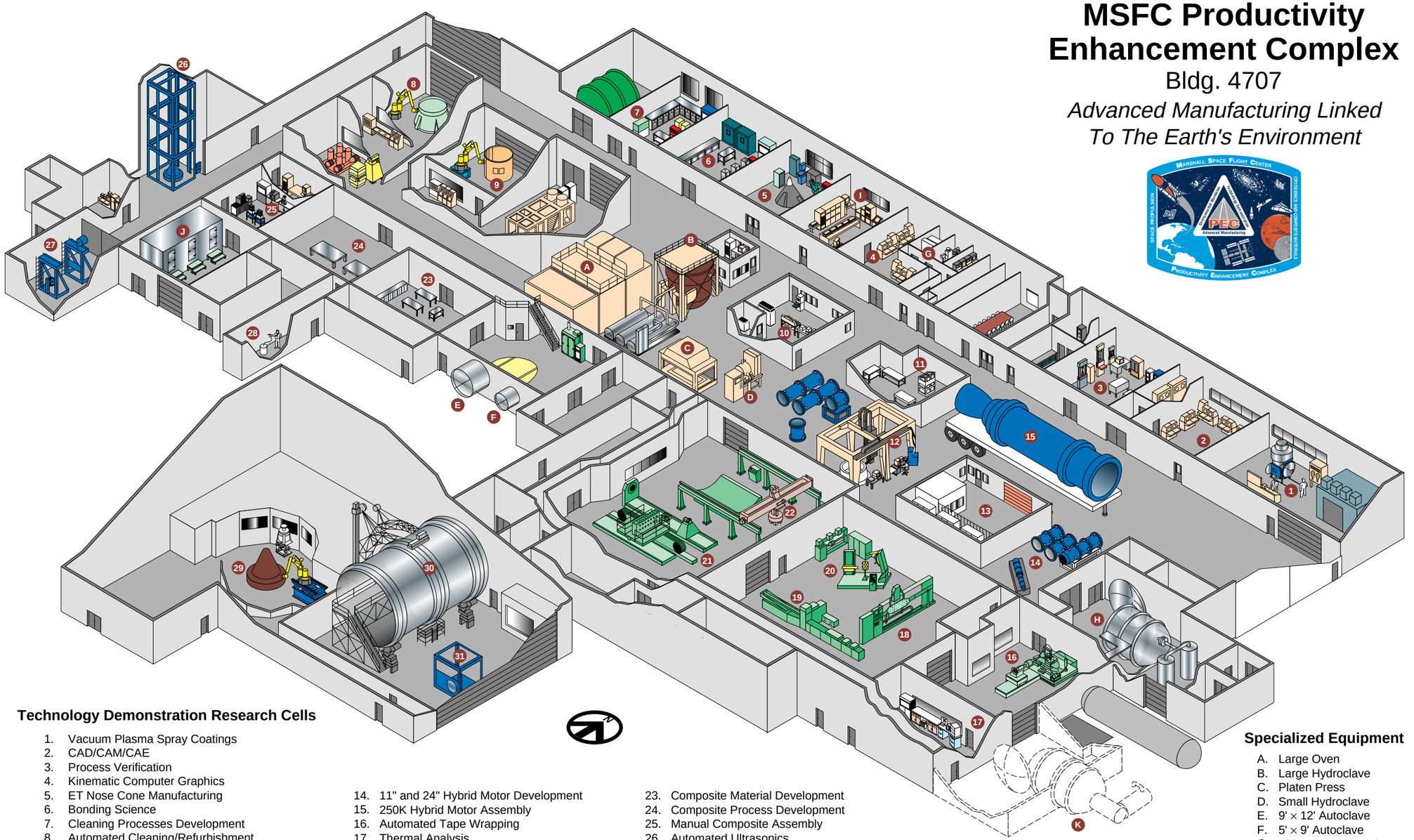
MSFC Productivity Enhancement Complex

Bldg. 4707

Advanced Manufacturing Linked To The Earth's Environment



Technology Demonstration Research Cells

1. Vacuum Plasma Spray Coatings
2. CAD/CAM/CAE
3. Process Verification
4. Kinematic Computer Graphics
5. ET Nose Cone Manufacturing
6. Bonding Science
7. Cleaning Processes Development
8. Automated Cleaning/Refurbishment
9. Cryogenic Insulation Process Development
10. Rapid Prototyping/Stereo Lithography
11. International Space Station Rack Assembly
12. Gantry Robotics
13. Subscale Solid Rocket Motor Development
14. 11" and 24" Hybrid Motor Development
15. 250K Hybrid Motor Assembly
16. Automated Tape Wrapping
17. Thermal Analysis
18. Helical Filament Winding
19. Pultrusion
20. Polar Filament Winding
21. Fiber Placement
22. 3-D Automated Tape Laying
23. Composite Material Development
24. Composite Process Development
25. Manual Composite Assembly
26. Automated Ultrasonics
27. Computed Tomography
28. Paint Technology
29. Sprayable Ablator
30. Tank Welding Application Tool
31. Hatch Life Cycle Test Fixture

Specialized Equipment

A. Large Oven
B. Large Hydroclave
C. Platen Press
D. Small Hydroclave
E. 9' × 12' Autoclave
F. 5' × 9' Autoclave
G. Video Documentation Center
H. Optical Lens Coating Chamber
I. Central Manufacturing Information System
J. Refrigerated Storage
K. Proposed Autoclave

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Benefits

A savings of both time and money can be realized when U.S. industry takes advantage of the structural testing capabilities available at Marshall Space Flight Center's Structures and Dynamics Laboratory.

The Technology

Some of the structural testing capabilities of MSFC's Structural Test Facilities include:

- **Large Structure Quasi-Static Load Testing Facility** - provides full-scale quasi-static load testing and functional performance verification.
- **Component/System Quasi-Static Load Testing Facility** - several universal load reaction structures test components and systems such as struts, brackets, plates, and panels.
- **Hazardous Structural Testing Facility** - provides structural strength and pressurization test capabilities for hazardous test operations.
- **Cryogenic Structural Testing Facility** - simulation, structural strength, and pressurization testing for hazardous cryogenic test operations.
- **Vibration Testing Facility** - eight electrodynamic exciters and five amplifiers validate flight and ground support hardware.
- **Vibroacoustic Testing Facility** - consists of a reverberation chamber, a progressive wave tube, and an anechoic chamber.
- **Pyrotechnic Shock Testing Facility** - a hazardous area equipped for generating dynamic transients with explosive materials.
- **Modal Testing Facility** - a facility equipped for testing flight structures, systems, payloads, and components requiring fixed, fixed-free, or free-free boundary conditions.

Contacts

Technology Transfer Office
Mail Code LA01
NASA/MSFC
Marshall Space Flight Center, AL 35812

Additional information about Marshall's Structural Test Facilities, NASA's Technology Transfer Program, and a Technology Transfer Agreement are available on the World-Wide Web:

http://techtran.msfc.nasa.gov

Key Words

Structural Testing	Vibration	Cryogenic
Dynamics Testing	Acoustic	
Technology Transfer	Modal	